UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/034,359	12/27/2001	Hideki Kenmochi	P 0277029 H7634US	8405

27496	7590	03/18/2005	

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EXAMINER
LERNER, MARTIN

ART UNIT	PAPER NUMBER
2654	

DATE MAILED: 03/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

		Application No.	Applicant(s)
Office Action Summary		10/034,359	KENMOCHI ET AL.
		Examiner	Art Unit
		Martin Lerner	2654

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☐ Responsive to communication(s) filed on _____ .

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1 to 17* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-6,9,10 and 15-17* is/are rejected.

7) ☒ Claim(s) *7,8 and 11-14* is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☒ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on <u>27 December 2001</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some *   c)☐ None of:

      1. ☒ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date *12/27/01 & 8/30/04.*

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☒ Other: *IDS: 10/4/04 & 10/21/04.*

DETAILED ACTION

Specification

1.   The title of the invention is not descriptive. A new title is required that is clearly

indicative of the invention to which the claims are directed.

2.   The following title is suggested: Singing Voice Synthesis Apparatus and Method

with Deterministic and Stochastic Components

3.   The disclosure is objected to because of the following informalities:

On page 5, line 30, "apparatus apparatus" should be –apparatus–.

On page 18, line 13, "deisgnates" should be –designates–.

On page 18, line 26, "desinates" should be –designates–.

On page 20, line 18, "unvocied" should be –unvoiced–.

On page 21, line 5, there should be a space between "blends" and "smoothly".

On page 28, line 10, there should be a space between "32" and "is".

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5.   Claims 1 to 6, 9 to 10, and 15 to 17 are rejected under 35 U.S.C. 103(a) as being

unpatentable over *Nakajima et al.* in view of *Serra et al. ('902)*.

Concerning independent claims 1, 15, 16, and 17, *Nakajima et al.* discloses an

apparatus, method, and computer program for singing sound synthesis, comprising:

"a phoneme database that stores a plurality of voice fragment data formed of

voice fragments each being a single phoneme or a phoneme chain of at least two

concatenated phonemes" – ROM 2 stores formant parameter data sets PHDATA|a|,

PHDATA|e|, PHDATA|i|, and PHDATA|z|, which correspond to respective phonemes

(vowels (voiced sounds) and consonants) of the Japanese and English language

(column 6, lines 50 to 62: Figure 2A);

"an input device that inputs lyrics" – data memory 4 stores song data SONG1,

SONG2, . . . , and SONGn, where the song data includes singing data LYRIC SEQ

DATA comprised of lyric data (column 6, line 65 to column 7, line 7: Figures 2C and

2D);

"a readout device that reads out from said phoneme database the voice fragment

data corresponding to the inputted lyrics" – phoneme code data LYPHONE is read in

(column 11, lines 3 to 30: Figure 7: Step S51). .

Concerning independent claims 1, 15, 16, and 17, *Nakajima et al.* omits "each of

the plurality of voice fragment data comprising data of a deterministic component and

data of a stochastic component." However, *Serra et al. ('902)* teaches an apparatus,

method, and computer program for synthesis of singing voices or vocal phrases,

comprising:

"each of the plurality of voice fragment data comprising data of a deterministic

component and data of a stochastic component" – sound synthesizer 110 synthesizes

sound corresponding to a deterministic component by supplying SMS data to a

deterministic waveform generator 110a, and sound corresponding to the stochastic

component by supplying SMS data to a stochastic waveform generator 110b (column

13, line 51 to column 14, line 10: Figure 4 – referring to Serra et al. ('509));

"a duration time adjusting device that adjusts time duration of the read-out voice

fragment data so as to match a desired tempo and manner of singing" – a time ·

modification technique performs control to lengthen or shorten the duration of a sound

of a vibrato cycle (column 26, lines 50 to 61); waveform data corresponding to the

segment used as the splicing waveform may be selected depending on the nature of a

sound to be synthesized and the user's taste (column 29, lines 11 to 38); implicitly, time

modification according to user control affects "a tempo and manner of singing";

"an adjusting device that adjusts the deterministic component and the stochastic

component of the read-out voice frame so as to match a desired pitch" – pitch analysis

and synthesis permits the pitch of the original SMS data to be modified so as to

correspond to a desired reproduction pitch (column 31, lines 29 to 48); control of a

desired pitch Pd is performed on both the deterministic component and the stochastic

component (column 33, lines 49 to 54);

"a synthesizing device that synthesizes a singing sound by sequentially

concatenating the voice fragment data that have been adjusting by said duration time

adjusting device and said adjusting device" – synthesis section 11 produces the

modified sound to be synthesized (column 9, lines 5 to 17: Figures 1 and 4).

Concerning independent claims 1, 15, 16, and 17, Serra et al. ('902) teaches an

objective of improving the practicality of sound analysis/synthesis by spectral modeling

synthesis (SMS) with deterministic and stochastic components that is advantageously of

extremely high quality. (Column 1, Line 6 to Column 2, Line 40) It would have been

obvious to one having ordinary skill in the art to provide spectral modeling synthesis

(SMS) with deterministic and stochastic components as taught by Serra et al. ('902) in

the singing sound-synthesizing apparatus and method of Nakajima et al. for the purpose

of advantageously producing sound of extremely high quality.

Concerning claims 2 and 3, Nakajima et al. discloses phoneme sounding time

PHONEMETIME designates an absolute time period for a sounding of each phoneme

(column 7, lines 7 to 52: Figure 2F); phoneme sounding time affects "dynamics and

tempo".

Concerning claim 4, Nakajima et al. discloses ROM 2 stores formant parameter

data sets PHDATA|a|, PHDATA|e|, PHDATA|i|, and PHDATA|z|, which correspond to

respective phonemes (vowels (voiced sounds) and consonants) of the Japanese and

English language (column 6, lines 50 to 62: Figure 2A); vowels correspond to

"elongating a single phoneme" and "vowel phoneme chains", and consonants

correspond to "consonant phoneme chains".

Concerning claim 5, Serra et al. ('902) discloses SMS analyzer 20 takes a sound

signal as a series of frames, and produces a set of magnitude spectral data ("frequency

domain data") by a fast Fourier transform (column 9, line 57 to column 10, line 2: Figure 2); a deterministic component and a stochastic component are obtained by a Fourier synthesis technique on the basis of the spectral data (column 13, line 52 to column 14, line 10: Figure 4).

Concerning claim 6, *Serra et al. ('902)* discloses lengthening of a sound duration is achieved by cutting out and repeatedly splicing a portion of the sound ("repeating at least one frame"), and shortening is achieved by deleting a properly chosen segment ("thinning out a predetermined number of frames") (column 26, lines 50 to 61).

Concerning claim 9, *Serra et al. ('902)* discloses an appropriate smoothing operation is applied to a deterministic component to allow smooth connection between the preceding and succeeding data ("sequentially concatenated") (column 29, lines 50 to 67); smoothing is also performed on the spectral envelope of the stochastic component (column 38, lines 50 to 57).

Concerning claim 10, *Serra et al. ('902)* discloses it is the deterministic component that represents the pitch during pitch analysis and synthesis, while the spectral envelope is represented by the stochastic component (column 31, lines 49 to column 33, line 54); thus, adjusting pitch by a deterministic component preserves the spectral envelope.

Allowable Subject Matter

6.   Claims 7, 8, 11, 12, 13, and 14 are objected to as being dependent upon a

rejected base claim, but would be allowable if rewritten in independent form including all

of the limitations of the base claim and any intervening claims.

Conclusion

7.   The prior art made of record and not relied upon is considered pertinent to

Applicants' disclosure.

        Kageyama et al., Kawashima et al., Elam, George et al., Ohta, and Matsumoto

disclose related art.

        Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Martin Lerner whose telephone number is (703) 308-

9064. The examiner can normally be reached on 8:30 AM to 6:00 PM Monday to

Thursday.

        If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Richemond Dorvil can be reached on (703) 305-9645. The fax phone

number for the organization where this application or proceeding is assigned is 703-
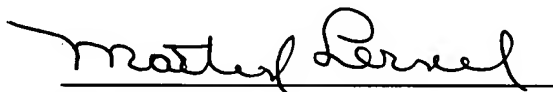
872-9306.

Information regarding the status of an application may be obtained from the

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published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

ML
3/14/05

Martin Lerner
Examiner
Group Art Unit 2654